

What is claimed is:

1. ~~An image forming apparatus comprising:~~

5 a receiving means for receiving an image data of a document;

a detecting means for detecting a screen angle of a document image based on the image data;

10 a setup means for selecting from a plurality of dither patterns a dither pattern with a screen angle different from the detected screen angle and setting up the dither pattern; and

a printing means for reproducing a quasi-half-tone using the dither pattern set up by said setup means.

15 2. An image forming apparatus according to claim 1, further comprising a reading means for reading the image data of the document.

20 3. An image forming apparatus according to claim 1, in which said detecting means detects screen angles of document images for cyan, magenta and yellow colors, and said setup means selects from a plurality of dither patterns a dither pattern with a screen angle different from the detected screen angle and sets up the dither pattern for each color.

4. An image forming apparatus according to claim 3, in which said detection means further comprises a color

~~conversion means for converting the image data into cyan,~~  
magenta, yellow and black image data, a resolution conversion  
means for converting the cyan, magenta, yellow and black  
image data into high resolution image data, and a storage  
5 means for storing the high resolution image data, wherein  
screen angles of document images for cyan, magenta and yellow  
color are detected based on the image data stored in said  
storage means.

5. An image forming apparatus according to claim 1, in  
10 which said detecting means has a plurality of detection  
patterns to compare the image data with the detection  
patterns, count the numbers of image patterns that match with  
the detection patterns, and determine an angle of a detection  
pattern that provides a maximum matching counts as the screen  
15 angle of the document image.

6. An image forming apparatus according to claim 1, in  
which said detecting means extracts an attention pixel from  
the image data, calculates average densities of peripheral  
pixels located in a plurality of directions relative to a  
20 direction perpendicular to the attention pixel, determines  
an angle that produces a maximum average density, and elects  
the determined angle as the screen angle of the document  
image.

7. ~~An image reading apparatus comprising:~~

~~a reading means for reading an image data of a document,~~

a detection means for detecting a screen angle of a document image based on the image data; and

a setup means for selecting from a plurality of dither patterns a dither pattern with a screen angle different from  
5 the detected screen angle and setting up the dither pattern.

8. An image reading apparatus according to claim 7, further comprises a data generating means for generating a print data in order to reproduce a quasi-half-tone using the  
10 dither pattern set up by said setup means.

9. An image reading apparatus according to claim 7, in which said detecting means detects screen angles of document images for cyan, magenta and yellow colors, and said setup means selects from a plurality of dither patterns a dither  
15 pattern with a screen angle different from the detected screen angle and sets up the dither pattern for each color.

10. An image reading apparatus according to claim 9, in which said detection means further comprises a color conversion means for converting the image data into cyan, magenta, yellow and black image data, a resolution conversion means for converting the cyan, magenta, yellow and black image data into high resolution image data, and a storage means for storing the high resolution image data, wherein  
20 screen angles of document images for cyan, magenta and yellow

~~color~~ are detected based on the image data stored in said storage means.

11. An image reading apparatus according to claim 7, in which said detecting means has a plurality of detection  
5 patterns to compare the image data with the detection patterns, count the numbers of image patterns that match with the detection patterns, and determine an angle of a detection pattern that provides a maximum matching counts as the screen angle of the document image.

10 12. An image reading apparatus according to claim 7, in which said detecting means extracts an attention pixel from the image data, calculates average densities of peripheral pixels located in a plurality of directions relative to a direction perpendicular to the attention pixel,  
15 determines an angle that produces a maximum average density, and elects the determined angle as the screen angle of the document image.

13. A printer controller comprises:

a detection means for detecting a screen angle of a  
20 document image based on an image data of a document inputted;

a setup means for selecting from a plurality of dither patterns a dither pattern with a screen angle different from the detected screen angle and setting the dither pattern;  
and

~~a data generating means for generating a print data in order to reproduce a quasi-half-tone using the dither pattern set up by said setup means.~~

14. A printer controller according to claim 13, in which said detecting means detects screen angles of document images for cyan, magenta and yellow colors, and said setup means selects from a plurality of dither patterns a dither pattern with a screen angle different from the detected screen angle and sets up the dither pattern for each color.

15. A printer controller according to claim 14, in which said detection means further comprises a color conversion means for converting the image data into cyan, magenta, yellow and black image data, a resolution conversion means for converting the cyan, magenta, yellow and black image data into high resolution image data, and a storage means for storing the high resolution image data, wherein screen angles of document images for cyan, magenta and yellow color are detected based on the image data stored in said storage means.

16. A printer controller according to claim 13, in which said detecting means has a plurality of detection patterns to compare the image data with the detection patterns, count the numbers of image patterns that match with the detection patterns, and determine an angle of a detection

~~pattern that provides a maximum matching counts as the screen~~  
angle of the document image.

17. A printer controller according to claim 13, in  
which said detecting means extracts an attention pixel from  
5 the image data, calculates average densities of peripheral  
pixels located in a plurality of directions relative to a  
direction perpendicular to the attention pixel, determines  
an angle that produces a maximum average density, and elects  
the determined angle as the screen angle of the document  
10 image.

18. An image forming system comprising:

a receiving apparatus for receiving an image data of  
a document;

a printer controller for detecting a screen angle of  
15 a document image based on the image data, selecting from a  
plurality of dither patterns a dither pattern with a screen  
angle different from the detected screen angle and setting  
the dither pattern; and

a printer for reproducing a quasi-half-tone using the  
20 dither pattern set up by said printer controller.

19. An image forming system according to claim 18,  
further comprising a reading apparatus for reading the image  
data of the document.

20. An image forming system according to claim 18, in

which said printer controller detects screen angles of document images for cyan, magenta and yellow colors, and selects from a plurality of dither patterns a dither pattern with a screen angle different from the detected screen angle and sets up the dither pattern for each color.

21. An image forming system according to claim 20, in which said printer controller further comprises a color conversion means for converting the image data into cyan, magenta, yellow and black image data, a resolution conversion means for converting the cyan, magenta, yellow and black image data into high resolution image data, and a storage means for storing the high resolution image data, wherein screen angles of document images for cyan, magenta and yellow color are detected based on the image data stored in said storage means.

22. An image forming system according to claim 18, in which said printer controller has a plurality of detection patterns to compare the image data with the detection patterns, count the numbers of image patterns that match with the detection patterns, and determine an angle of a detection pattern that provides a maximum matching counts as the screen angle of the document image.

23. An image forming system according to claim 18, in which said printer controller extracts an attention pixel

from the image data, calculates average densities of peripheral pixels located in a plurality of directions relative to a direction perpendicular to the attention pixel, determines an angle that produces a maximum average density, and elects the determined angle as the screen angle of the document image.

24. A record medium for storing a program readable and executable by a computer, said program comprising the steps of:

- (A) receiving an image data of a document;
- (B) detecting a screen angle of a document image based on the image data;
- (C) selecting from a plurality of dither patterns a dither pattern with a screen angle different from the detected screen angle and setting the dither pattern; and
- (D) reproducing a quasi-half-tone using the setup dither pattern.

25. A record medium according to claim 24, in which said program further comprises the steps of (E) reading the image data of the document, and (F) transmitting the read image data.

26. A record medium according to claim 24, in which said step (B) of said program consists of (1) converting the image data into cyan, magenta, yellow and black image data, (2)



~~converting said cyan, magenta, yellow and black image data~~  
into high resolution image data, (3) storing the high  
resolution image data, and (4) detecting screen angles of  
document images for cyan, magenta, and yellow colors based  
5 on the stored image data.

27. A record medium according to claim 24, in which said  
step (B) of said program consists of (1) comparing the image  
data with a plurality of detection patterns, (2) counting  
the number of image patterns that match with the detection  
10 patterns, (3) selecting a detection pattern that provides  
a maximum matching counts, and (4) determining an angle of  
the selected detection pattern as the screen angle of the  
document image.

28. A record medium according to claim 24, in which said  
15 step (B) of said program consists of (1) extracting an  
attention pixel from the image data, (2) calculating average  
densities of peripheral pixels located in a plurality of  
directions relative to a direction perpendicular to the  
attention pixel, (3) determining an angle that produces a  
20 maximum average density, and (4) electing the determined  
angle as screen angle of the document image.